

WHAT IS CLAIMED IS:

1. An exhaust pipe collecting structure for a multi-cylinder engine unit having multiple cylinders, in which exhaust pipes extend from at least four cylinders of the multiple cylinders and are collected into one exhaust passage at a location downstream in a flow of exhaust gases, the structure comprising:

a first exhaust pipe group and a second exhaust pipe group each of which is comprised of two exhaust pipes selected from four exhaust pipes respectively connected to the four cylinders;

a first exhaust sub-collecting pipe cast integrally with the first exhaust pipe group;

a second exhaust sub-collecting pipe cast integrally with the second exhaust pipe group;

a first joint portion located at a downstream end portion of the first exhaust sub-collecting pipe; and

a second joint portion located at a downstream end portion of the second exhaust sub-collecting pipe, wherein

the first joint portion and the second joint portion are joined to each other to allow the exhaust gases discharged from the four exhaust pipes to be led into one exhaust passage.

2. The exhaust pipe collecting structure according to Claim 1, wherein the first joint portion has a first semicylindrical peripheral wall opened toward the second joint portion with a parting line extending along a direction of the flow of the exhaust gases,

the second joint portion has a second semicylindrical peripheral wall opened toward the first joint portion with a parting line extending along a direction of the flow of the exhaust gases, and

the first and second semicylindrical peripheral walls are joined to be formed into the one exhaust passage such that an opening of the first joint portion and an opening of the second joint portion face each other and the direction of the flow of exhaust gases of the first joint portion corresponds with the direction of the flow of exhaust gases of the second joint portion.

3. The exhaust pipe collecting structure according to Claim 2, further comprising a rubber tube that covers an outer periphery of the first and second semicylindrical peripheral walls that are joined to face each other.

4. An exhaust pipe collecting structure for a multi-cylinder engine unit having multiple cylinders, in which exhaust pipes extend from at least four cylinders of the multiple cylinders and are collected into one exhaust passage at a location downstream of the exhaust pipes in a flow of exhaust gases, the structure comprising:

a first exhaust pipe group and a second exhaust pipe group each of which is comprised of two exhaust pipes selected from four exhaust pipes respectively connected to the four cylinders;

a first exhaust sub-collecting pipe cast integrally with the first exhaust pipe group;

a second exhaust sub-collecting pipe cast integrally with the second exhaust pipe group;

a first joint portion located at a downstream end portion of the first exhaust sub-collecting pipe; and

a second joint portion located at a downstream end portion of the second exhaust sub-collecting pipe, the first and second joint portions respectively having outer walls joined to each other to allow exhaust passages of the first and second joint portions to be defined by the outer walls, wherein

the first joint portion and the second joint portion are joined to each other to allow the first and second exhaust sub-collecting pipes to be integral with each other as seen from outside,

an exhaust gas discharged from the first exhaust pipe group is led into the exhaust passage of the first joint portion and an exhaust gas discharged from the second exhaust pipe group is led into the exhaust passage of the second joint portion, and

exhaust passages inside the joint portions are arranged adjacently.

5. The exhaust pipe collecting structure according to Claim 4, further comprising a connecting tube located downstream of the first and second joint portions, for collecting the exhaust gases flowing through the exhaust passages inside the first and second joint portions.

6. The exhaust pipe collecting structure according to Claim 5, wherein the connecting tube is cast by a mold with a two-part parting line extending along a longitudinal direction of the connecting tube.

7. The exhaust pipe collecting structure according to Claim 6, wherein the first and second exhaust sub-collecting pipes and the connecting tube have double-walled structures to have cooling passages between walls.

8. An exhaust pipe collecting structure for a multi-cylinder engine unit having multiple cylinders, in which exhaust pipes extend from cylinders of the multiple cylinders and are collected into one exhaust passage at a location downstream of the exhaust pipes in a flow of exhaust gases, the structure comprising:

connecting tube; and

an exhaust manifold attached on the connecting tube, the exhaust manifold including:

a first exhaust sub-collecting pipe and a second exhaust sub-collecting pipe located on downstream portions of exhaust pipes extending from the cylinders, the first and second exhaust sub-collecting pipes being configured to have internal independent exhaust passages of the exhaust gases flowing from the exhaust pipes, the first and second exhaust sub-collecting pipes being integral with each other at least at their joint portions as seen from outside; and

a first water jacket formed at the joint portions to have a water flow cross-section elongate in a direction perpendicular to a casting parting plane forming a boundary of the first and second exhaust sub-collecting pipes as seen in a cross-sectional view.

9. The exhaust pipe collecting structure according to Claim 8, wherein the multiple cylinders are four cylinders,

the first exhaust sub-collecting pipe is configured to have internal independent exhaust passages of the exhaust pipes of two cylinders selected from the four cylinders, and

the second exhaust sub-collecting pipe is configured to have internal independent exhaust passages of the exhaust pipes of the remaining two cylinders,

the first water jacket is formed at the joint portions where the first and second exhaust sub-collecting pipes are integral with each other, to have the water flow cross-section that is elongate in a direction from a region between the two exhaust pipes of the first exhaust sub-collecting pipe to a region between the two exhaust pipes of the second exhaust sub-collecting pipe so as to cross the casting parting plane forming the boundary of the first and second exhaust sub-collecting pipes as seen in a cross-sectional view.

10. The exhaust pipe collecting structure according to Claim 9, wherein the exhaust pipe collecting structure is integrally cast by locating the casting parting plane of the exhaust pipe collecting structure within one continuous plane.

11. The exhaust pipe collecting structure according to Claim 8, wherein the connecting tube comprises:

a plurality of connecting exhaust passages communicating with the exhaust pipes of the exhaust manifold and being merged into a single exhaust passage; and

a second water jacket extending to a position upstream of the single exhaust passage so as to substantially define two groups of the connecting exhaust passages.

12. The exhaust pipe collecting structure according to Claim 11, wherein the connecting exhaust passages are collected at a location inside the connecting tube provided downstream of the exhaust manifold having the exhaust pipes.

13. The exhaust pipe collecting structure according to Claim 12, wherein

the first water jacket is formed in part of the exhaust sub-collecting pipes so as to substantially define exhaust passages of the exhaust sub-collecting pipes as seen in a cross-sectional view, and

at a connecting portion between the exhaust manifold and the connecting tube, the first water jacket of the exhaust manifold is connected to the second water jacket of the connecting tube such that a longitudinal axis of a water flow cross-section of the first water jacket of the exhaust manifold crosses a longitudinal axis of a water flow cross-section of the second water jacket of the connecting tube.

14. The exhaust pipe collecting structure according to Claim 13, wherein a water flow portion where the water flow cross-section of the first water jacket of the exhaust manifold and the water flow cross-section of the second water jacket of the connecting tube overlap with each other with their longitudinal axes crossing each other is enlarged.